

# MISSOURI CONSERVATIONIST

VOLUME 84, ISSUE 3, MARCH 2023  
SERVING NATURE & YOU





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# Contents

MARCH 2023  
VOLUME 84, ISSUE 3



## FEATURES

### 10 Missouri Caves

Exploring the living world  
in these dark places.

by Shelly Colatskie

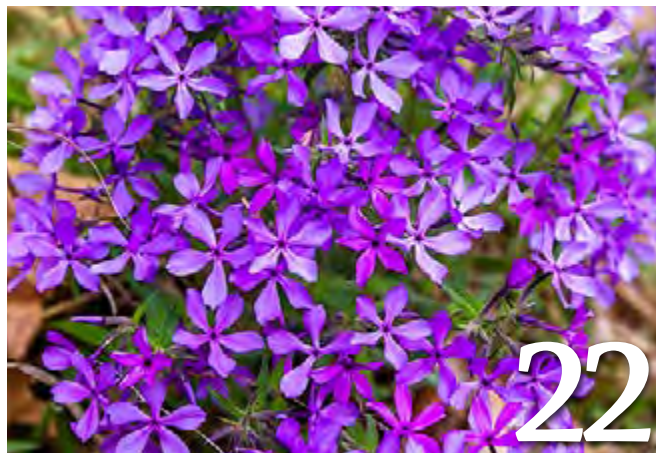
### 16 Swift-Water Rescue

MDC agents learn lifesaving  
skills for dangerous waters.

by Bill Graham

### 22 Resuming Her Loveliness

Awakening from winter, nature  
abounds with beauty.



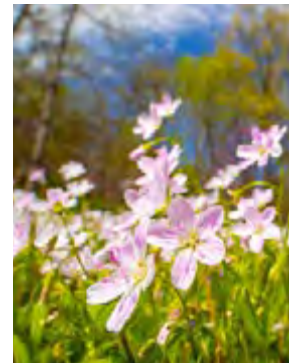
## DEPARTMENTS

- 2 Inbox
- 3 Up Front with Sara Parker Pauley
- 4 Nature Lab
- 5 In Brief
- 28 Get Outside
- 30 Places To Go
- 32 Wild Guide
- 33 Outdoor Calendar



Red fox

## MISSOURI CONSERVATIONIST



### ON THE COVER

Spring beauty

 **NOPPADOL PAOTHONG**

15mm lens, f/16  
1/160 sec, ISO 400

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# Inbox



## Letters to the Editor

Submissions reflect readers' opinions and may be edited for length and clarity. Email [Magazine@mdc.mo.gov](mailto:Magazine@mdc.mo.gov) or write to us:

MISSOURI  
CONSERVATIONIST  
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JEFFERSON CITY, MO 65102

## SCALESHELL

Your February article about scaleshells was interesting [Page 8]. I have a mussel shell, given to me by my father many years ago, with seven perfectly round holes made by a button factory in Osceola.

Ethelene Stark  
via email

## WINTER HIKE

My wife, Merilee, and I could so relate to Jill Pritchard's latest episode of *Nature Boost* [Episode 36: Let's Go on a Winter Hike]. Everything she referenced about winter hiking is so true. My wife and I enjoyed a winter hike at the Hayes Spring Conservation Area in Stone County. The peace and tranquility of the experience is unequaled.

Curt Lewis Battlefield

*Editors' note: Join MDC's Jill Pritchard, host of the podcast Nature Boost, as she explores everything nature has to offer — from health benefits and wildlife viewing, to outdoor recreation and unbelievable conservation stories. Listen to past episodes at [short.mdc.mo.gov/ZHB](https://short.mdc.mo.gov/ZHB). Subscribe and get your own nature boost!*

## FERAL HOG ELIMINATION

I was pleased to read in the January 2023 edition that the Missouri Feral Hog Elimination Partnership is making progress in eliminating feral hogs from our state [Annual Review, Page 15]. I was not surprised, though, since I have noticed that there is less hog damage at Mingo National Wildlife Refuge than there was a few years ago.

But there is more work to be done! That is why I have signed up my property in Crawford County to allow aerial operations for removing hogs, and

I encourage other Missouri landowners to do the same. When we all work together, we can be successful in protecting fragile habitats from being damaged by feral hogs.

John Hickey St. Louis

## TICKS

I was pleased to see *Show-Me Ticks* in the February issue [Page 16]. Many people may not be aware of potential dangers of tick bites, as they are so commonplace in many parts of our state. One disease associated with tick bites is alpha-gal syndrome. Alpha-gal causes an allergy to mammal meat, and the consequences of eating a simple hamburger can be dire. Since the age of 10, my grandson has had to have an EpiPen available in case of anaphylactic shock. Tick bites should be taken seriously!

Thank you for your wonderful magazine, I look forward to every issue.

Alan Coffman Washington

*Editors' note: Alpha-gal syndrome is an allergic reaction to a tick bite. There are multiple tick species associated with this syndrome and symptoms vary from person to person just like any allergic reaction. During this study, the lab was not equipped to study both bacterial pathogens and allergic reactions at the same time, so scientists focused on bacterial pathogens transmitted by ticks. This study is the first of its kind in Missouri, and the goal is to continually build on that information to educate the public and the medical community about ticks.*

## Connect With Us!



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## Have a Question for a Commissioner?

Send a note using our online contact form at [mdc.mo.gov/commissioners](https://mdc.mo.gov/commissioners).

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The Missouri Department of Conservation protects and manages the fish, forest, and wildlife of the state. We facilitate and provide opportunity for all citizens to use, enjoy, and learn about these resources.





### Want to see your photos in the Missouri Conservationist?

Share your photos on Flickr at  
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or email [Readerphoto@mdc.mo.gov](mailto:Readerphoto@mdc.mo.gov).



1

1 | Downy  
woodpecker by  
**Mike Nolen**,  
via Flickr

2 | Bloodroot by  
**Kathy Bildner**,  
via Flickr

3 | Mourning  
cloak butterfly  
by **Bill Allen**,  
via Flickr



2



3



### Want another chance to see your photos in the magazine?

➔ In the December issue, we plan to feature even more great reader photos. Use the submission methods above to send us your best year-round pictures of native Missouri wildlife, flora, natural scenery, and friends and family engaged in outdoor activities. Please include where the photo was taken and what it depicts.



# Up Front

with Sara Parker Pauley

✱ I fulfilled a lifelong bucket list trip last summer to the Galápagos Islands off the coast of Ecuador. Amid the string of volcanic islands with its array of exotic — almost unearthly — flora and fauna, a highlight was the famed blue-footed booby bird, its feet sporting various shades of turquoise. Our guides told us the more vibrant the blue, the healthier the bird and the more attractive to potential mates. I laugh now when viewing the ridiculous number of photos I took of these birds with their feet of brilliant blue.

We humans are wired for color. By winter's end, I am weary of the many shades of brown that line the horizon. My eyes are hungry for the first showing of spring — I first note the countless shades of green in the newly formed leaves all around me; next are pops of pink and purple in the spring beauty, rose verbena, and redbud; and soon the warm colors of the season's palette are everywhere. (Check out our collage of spring photos starting on Page 22).

Our winter days are dwindling now, and spring is breaking forth. There is a freshness to the world — filled with new life and renewal. I note the drab winter color in the feathers of the molting goldfinch and watch as the drab gives way to the bright yellow of the finch's spring plumage. One need not venture to distant lands to be amazed by the vibrant color all around us. Spring is here!

*Sara Parker Pauley*

**SARA PARKER PAULEY**, DIRECTOR  
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# Nature LAB

by Dianne Van Dien

Each month, we highlight research MDC uses to improve fish, forest, and wildlife management.

## INVASIVE SPECIES MANAGEMENT

### Missouri Invasive Plant Lists

✳ All over the U.S., nonnative invasive plants are outcompeting native plants and disrupting ecosystems. Managing them is a never-ending challenge. With more than 140 invasive plant species recorded in our state, how do land managers decide where to focus their efforts?

To help answer this question, the Missouri Invasive Plant Council — a group of nonprofits, private industries, and federal and state agencies (including MDC) — established a list of Missouri's top invasive plants. The plants were ranked by impact to Missouri's natural communities, abundance, and how fast they are spreading. In 2021, a "Top 25 Overall" list and a "Top 25 Expanding" list were published.

"We prioritize the high impact species because they have the highest potential to do the most damage to our natural systems," says MDC Invasive Species Coordinator Angela Sokolowski.

Using the lists, land managers can approach invasive plants strategically. Areas already overrun by



Bush honeysuckle



Sericea lespedeza

Invasive plants not only affect natural landscapes and wildlife but can also compromise agriculture and outdoor recreation. Bush honeysuckle can take over the forest understory, pushing out forbs and grasses needed by wildlife. Sericea lespedeza can overrun pastures, leaving cattle with lower quality forage.

Invasive plant lists guide strategies for managing invasive plants

invasives need attention, but it's equally important to catch the high impact species before they become fully established.

"When an invasive species first arrives in an area, its impact stays low for a while," Sokolowski explains. "Then there's a stage where the population explodes. The further along in that timeline and the larger that population gets, the longer and bigger investment of time, money, and people it takes to achieve any sort of effective control. If we can recognize these species, we can treat them early and prevent a massive, broadscale takeover."

The Missouri Invasive Plant Council ranks invasives not only for the state overall but also by region. You can learn which invasive plants to watch for in your area and what they look like at [moinvasives.org/lists](https://moinvasives.org/lists).

### Missouri's Top Invasive Plants at a Glance

Invasive plants are nonnative species that spread rapidly, often pushing out native plants, upsetting ecosystems, and reducing the quality of agricultural lands. Top overall statewide invasives:

- Sericea lespedeza
- Callery pear
- Bush honeysuckle
- Reed canary grass
- Garlic mustard
- Autumn olive
- Japanese honeysuckle
- Oriental bittersweet
- Himalayan blackberry
- Japanese stiltgrass



Although highly invasive, Callery pear trees are still sold at many nurseries. You can plant native species such as flowering dogwood and serviceberry instead. They, too, have lovely white flowers in spring.

### How You Can Help Slow the Spread of Invasives

- Learn which species are invasive.
- Remove invasive plants when you find them.
- Landscape with native plants.

Native plants offer more value to wildlife and often require minimal care since they are adapted to our soils and climate.



# In Brief

News and updates from MDC



## PADDLEFISH SEASON OPENS MARCH 15

LAKE OF THE OZARKS,  
HARRY S. TRUMAN  
RESERVOIR, AND  
TABLE ROCK LAKE ARE  
SNAGGING HOTSPOTS

➔ Paddlefish — named for their large, paddle-shaped snouts — are an ancient species that can grow to 7 feet and weigh more than 100 pounds.

The paddlefish snagging season for these and most other waters in the state runs March 15 through April 30. The season for the Mississippi River is March 15 through May 15, with a fall season Sept. 15 through Dec. 15.

A fishing permit is required, unless exempt. The daily limit is two paddlefish, and the possession limit is four. No person shall continue to snag after taking a daily limit of two paddlefish on these waters.

Learn more about paddlefish, snagging regulations, minimum lengths, snagging reports, and more at [short.mdc.mo.gov/Z9B](https://short.mdc.mo.gov/Z9B).



## MDC REPORTS FINAL DEER HARVEST

Missouri's 2022-2023 deer hunting season ended Jan. 15 with a preliminary total deer harvest for the season of 299,721. Of the deer harvested, 140,736 were antlered bucks, 27,029 were button bucks, and 131,956 were does.

Top harvest counties for the overall deer season were Franklin with 6,471 deer harvested, Callaway with 5,438, and Jefferson with 4,966.

Hunters harvested 295,143 deer during the 2021-2022 deer hunting season with 143,815 being antlered bucks, 26,750 being button bucks, and 124,578 being does.



## TROUT ANGLERS

Missouri has a wealth of trout waters, including four trout parks and red-, white-, and blue-ribbon areas that support naturally reproducing trout. For more information on trout fishing in Missouri, visit MDC online at [short.mdc.mo.gov/Zvy](https://short.mdc.mo.gov/Zvy). Get the *Trout Fishing in Missouri* booklet online at [short.mdc.mo.gov/4Yq](https://short.mdc.mo.gov/4Yq) or free at many MDC locations (call ahead for availability).

## 2023 FISHING PROSPECTS

MDC's new *Fishing Prospects* report contains summaries of fish populations at many of our managed areas and predictions of "best bet" locations for catching certain fish species. Find it on the free MO Fishing app at [short.mdc.mo.gov/Zoh](https://short.mdc.mo.gov/Zoh) or online at [fishing.mdc.mo.gov](https://fishing.mdc.mo.gov). A print version is available free at many MDC locations (call ahead for availability) or online at [short.mdc.mo.gov/4Yq](https://short.mdc.mo.gov/4Yq).



# Ask MDC

## Got a Question for Ask MDC?

Send it to [AskMDC@mdc.mo.gov](mailto:AskMDC@mdc.mo.gov)  
or call 573-522-4115, ext. 3848.

### Q: Does Missouri have wolves?

➔ Individual wolves do occasionally wander into Missouri from other states, particularly the upper Midwest. Since 2001, there have been six confirmed sightings of gray wolves in Missouri. Gray wolves once ranged across several continents, including North America. While it is possible, seeing a gray wolf in Missouri is not likely. The gray wolf (*Canis lupus*), also known as the timber wolf, is listed as extirpated, or eliminated, from Missouri and seven surrounding states.

Wolves are protected as an endangered species in much of the United States, including Missouri.

Red wolves (*Canis rufus*) are one of the world's most-endangered canids. Native to the southeastern United States, red wolves were nearly driven to extinction by the mid-1900s. In 1950, a small female taken in Taney County became the last red wolf on record in Missouri. The red wolf was declared extinct in the wild in 1980, but a captive breeding program has resulted in this mammal being reintroduced into a small area in North Carolina.

In Missouri, seeing a coyote is more likely. During the winter, coyotes have thick coats that make them look

larger than they are. Wolves have longer legs, which are quite noticeable in photos. Additionally, a few species of domesticated dogs resemble wolves in size, expression, and coloration. Seen at a distance, on a game camera, in dim light, or only momentarily, it can be relatively easy to confuse a Siberian husky, Saarloos wolfdog, Alaskan malamute, or wolf hybrid with a wild canine.

### Q: Does Missouri have any old-growth forests?

➔ Yes and no. Missouri has a number of old-growth stands with trees more than 150 years old. Many of them are on dry sites often associated with glades or rocks where the trees, while not large, can be ancient. These dry forests are often described as woodlands by ecologists. However, no remaining forest or woodland in Missouri is pristine in the sense of never having been affected by humans.

Fires by Native Americans and later open-range livestock grazing and fires by European settlers have touched virtually every wooded acre in the state. However, a few forests and woodlands were able to escape the wave of harvesting and land clearing that swept through Missouri in the early 1900s. Some tracts were hard





Caney Mountain Natural Area

to reach or had poor-quality timber, while others had owners who conserved the land. At the time of European settlement, Missouri's forests and woodlands — upland and bottomland — covered about 25 million acres.

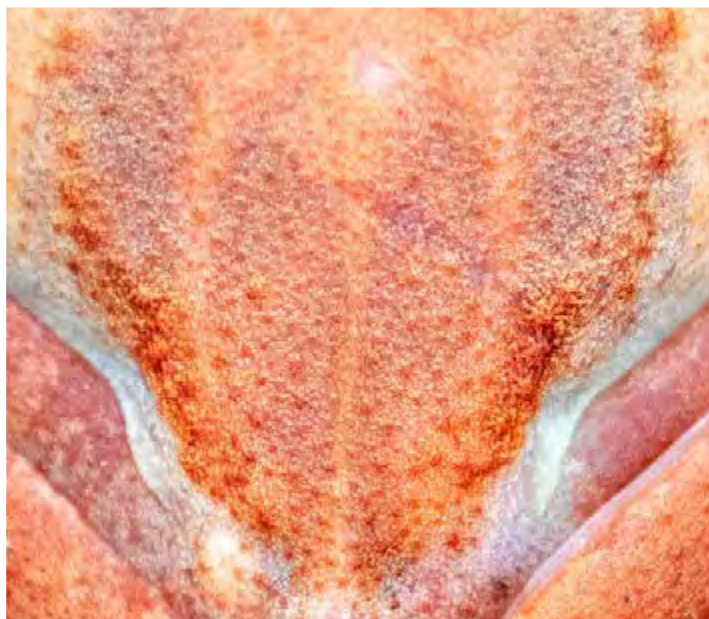
Today, nearly two-thirds of upland forest and woodland acreage remains, although in an altered state. Fewer than 8,000 acres would be considered

good examples of relatively undisturbed old-growth forest and only 800 acres would be considered excellent. A good way to experience old-growth forests is to visit Missouri's natural areas. For example, Caney Mountain is home to gnarled and wizened post and chinkapin oaks more than 200 years old. To find more old-growth forest locations, visit [short.mdc.mo.gov/4fv](http://short.mdc.mo.gov/4fv).

## What IS it?

Can you guess this month's natural wonder?

The answer is on Page 9.



### Corporal Brian Bartlett

CLAY COUNTY  
CONSERVATION AGENT

*offers this month's*

## AGENT ADVICE

If springtime weather has you reaching for your fishing pole, walleye is a great game fish to pursue. Before you head to the water, be sure you know your fishing hole's regulations. For example, on unimpounded waters from Feb. 20 through April 14, walleye can only be taken and possessed between a half-hour before sunrise and a half-hour after sunset. Walleye less than 15 inches must be released unharmed back into the water immediately regardless of where you are fishing. Finally, anglers cannot clean walleye while on the water or bank.

FOR MORE INFORMATION ON WALLEYE FISHING, CHECKOUT A SUMMARY OF MISSOURI FISHING REGULATIONS ONLINE AT [SHORT.MDC.MO.GOV/4ZP](http://SHORT.MDC.MO.GOV/4ZP).



# WE ARE CONSERVATION

Spotlight on  
people and partners

by Angie Daly Morfeld

## Connie Hanner

➔ Connie Hanner, a resident of a mobile home community in Cape Girardeau, was searching for ways to reduce the mowing area in her small yard and to improve drainage. She knew that native plant landscaping could help but struggled to find people with experience to guide her.

### Pollinator's paradise

Hanner turned to the Horticulture Department at Southeast Missouri State University, which put her in touch with Karel Edgar. Edgar visited Hanner at her home and developed a multi-phase plan to turn the yard into a pollinator's paradise.

### In her own words

"We jumped in with both feet," Hanner said. "The first bed turned into the second bed, then water features were added, and so on. Now, I have a haven for the bees, birds, butterflies, and bugs."

Neighbors have taken notice.

"People ask me about planting natives," Hanner said. "They may not want to do their whole yard, just a container. But I say, 'Do something. Every butterfly helps.'"

by David Stonner



Connie Hanner stands outside her home next to one of her native flower beds.

What's **your** conservation superpower?





## MONASP STATE TOURNAMENT

Get ready for another exciting year of archery competition and fun at the 2023 Missouri National Archery in the Schools Program (MoNASP) State Archery Tournament March 15–18 at the Branson Convention Center. Get more information and tournament details at [short.mdc.mo.gov/4fr](https://short.mdc.mo.gov/4fr).

## NEW HUNTING, FISHING BOOKLETS AVAILABLE

Missouri hunters, trappers, anglers, and others can get free copies of MDC's updated booklets on spring turkey hunting, hunting and trapping, and fishing, starting in early March. The handy booklets have information on related permits, seasons, species, regulations, limits, conservation areas, sunrise and sunset tables, and more.

The new booklets on *2023 Spring Turkey Hunting Regulations and Information*, *Summary of Missouri Hunting and Trapping Regulations*, and *Summary of Missouri Fishing Regulations* are available for free at many MDC locations and where permits are sold. Call ahead for availability. You can also view, download, or order them online at [short.mdc.mo.gov/4Yc](https://short.mdc.mo.gov/4Yc).



## WHAT IS IT?

### WOOD FROG

Wood frogs are medium-sized and can be pink tan, light brown, red brown, or dark brown. They are secretive and solitary, making them difficult to observe after their short breeding season, between early February and late March. During warm and moist weather conditions, wood frogs call during the day. Spring peepers chorus and breed along with wood frogs, but peepers' loud, high-pitched calls easily overpower the muted calls of the wood frogs. Oak-hickory forest, with sugar maple, is their preferred habitat. (See *Wild Guide*, Page 32, for more information on spring peepers.)







# Missouri *Caves*

EXPLORING THE LIVING WORLD  
IN THESE DARK PLACES

by Shelly Colatskie

Devils Well  
Shannon County

PHOTOGRAPH BY  
DAVID STONNER





AS I PEERED OVER THE edge, 75 feet to the rocky bottom, my heart raced. Our survey team's gear was triple checked by some of the most experienced vertical cavers to ensure our safety. As I slowly rappelled down, the sunlight gave way to darkness and a musty, earthy odor that cavers know well. With my feet finally finding the safety of the cave floor, I wiggled out of the harness and waited until the others made the same journey.

With our heart rates calming, we aimed our headlamps in different directions and revealed hundreds of thousands of bats carpeting the cave walls. Nearly 500,000 endangered gray bats call the cave home in the winter, serving as Missouri's largest gray bat hibernaculum and one of the largest throughout the gray bat's range.

After spending less than an hour in the cave, we began the ascent back to the top. As I took breathing breaks on the ascent, I noticed the walls of the cave are mantled in mosses. This made me think, what other cave life are we missing as we explore these caves?



## Missouri Cave Basics

Of Missouri's 80-plus natural communities, caves seem the most alien, hosting just as alien-looking creatures, found nowhere else on earth. While Missouri is dubbed "The Cave State" because of the number of "show caves," Missouri still is second to Tennessee, which claims over 10,000 natural caves. Missouri's caving community adds more caves and mapped passage to the list each year. With each passing year, more caves are discovered but at present over 7,500 caves are known for Missouri. How many more are waiting to be discovered?

The definition of a cave varies by state, but the Missouri Speleological Survey defines a cave as "any natural feature within bedrock enterable by humans for an appreciable distance."

Missouri caves consist of air-filled underground openings generated in limestone, dolomite, or more rarely, sandstone. Karst features, including caves, form when carbon dioxide from the air mixes with rainwater, dead plant material, and soil. As the slightly acidic water moves through the rock, it dissolves and creates cracks and openings. Most of the average rock that makes up Missouri's caves are between 300 to 500 million years old.

Like a snowflake, each cave is unique. They vary in their difficulty to explore, variety of cave formations, geologic composition, diversity of cave life, and extent of passage.

Some caves are completely barren of formations, also known as speleothems, whereas other caves display an extravagant array of beautiful formations. Stalactites are formations that begin on the ceiling of the cave, and stalagmites are formations that begin on the ground/floor of the cave. Other cave formations include columns, cave bacon, rimstone dams, cave pearls, draperies, soda straws, helictites, and more.

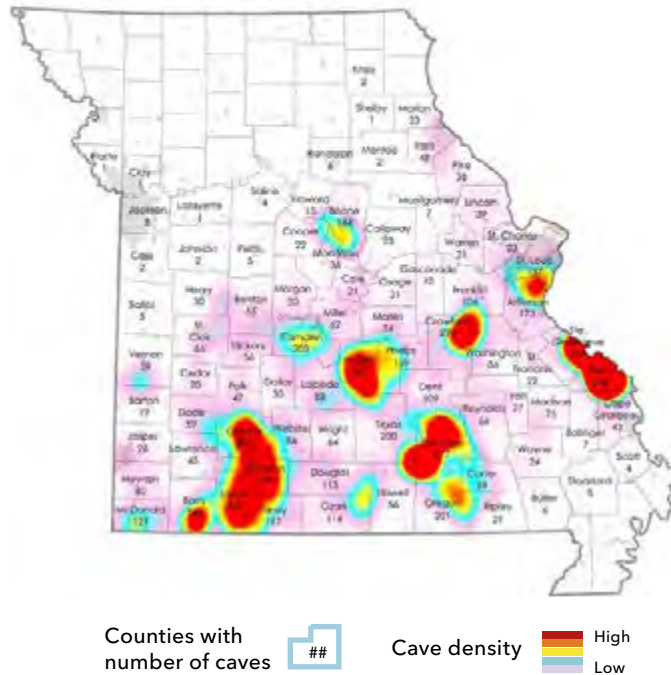
Missouri's caves range in length from 20 feet to more than 30 miles of mapped passage. With its abundance of soluble stone, the Missouri Ozarks harbor the greatest density of caves. With over 730 recorded caves, Shannon County holds the title for most caves for a single county in Missouri.

## Caves of Missouri – 2017

Total reported caves by quad: 7,129

Total reported caves by county: 7,302

Data courtesy of Missouri Speleological Survey, Inc.



While now outdated, this map, created by the Missouri Speleological Survey, shows the density of caves throughout Missouri, as well as the number of caves in each county. There are now more than 7,500 caves found in Missouri.



Missouri's caves host many spectacular cave formations such as columns, draperies, and flowstone.





Many of Missouri's caves support streams, which in turn support a diverse array of cave life.

Most, but not all, caves are comprised of three basic zones:

**The Entrance Zone:** Often called “the dripline,” many plant species are found here, including mosses, ferns, and liverworts. Animals may retreat to the entrance zone to cool off on a hot day. Eastern phoebe nests, cave orb weaver spiders, fishing spiders, and surface-dwelling millipedes are also found commonly at the entrance zone.

**The Twilight Zone:** Most cave life resides just past the entrance, but where sunlight is still visible. Some species of birds, such as turkey vultures and owls, nest here. Snakes may slither this far back and surprise an inattentive caver. Cave salamanders, western slimy salamanders, and pickerel frogs are some of the most common amphibians frequenting this zone. Shining your light on the walls may reveal the striking yellow or silvery sparkle of chemolithoautotrophic bacteria (CLAT) as far as 1,000 feet into the cave. These bacteria get the energy they need from the chemicals in the cave rock.

**The Dark Zone:** This is total darkness and home to endemic creatures (found nowhere else on earth). Adapted to living in complete darkness, some of these animals are blind and white or translucent in appearance. However, other creatures, such as gray bats, form large colonies in the dark zone. Their guano provides food for many cave creatures such as rove beetles, pseudoscorpions, and grotto salamanders.

### Cave Life Definitions

**Trogloxene:** cave visitor, utilizes caves at some point in their life, but also lives outside of caves (raccoons, bats)

**Troglophile:** can complete lifecycles both inside and outside of caves (cave salamander, slimy salamander)

**Stygophile:** aquatic troglophile (some species of amphipods, isopods, and planaria)

**Troglobite:** spends its entire life inside a cave in total darkness; blind, white, or transparent in color (grotto salamander)

**Stygobite:** aquatic troglobite (Ozark cavefish, Salem cave crayfish)



Fishing spider



## Missouri Cave Life

Missouri's caves host over 1,100 known species, including amphibians, reptiles, mammals, birds, fish, and a variety of invertebrates. Evidence of many Pleistocene mammal fossils and signs, such as direwolf, flat-headed peccary, American lion, and jaguar, among others, have been found in Missouri's caves. While some cave creatures, like inquisitive raccoons, only visit a cave for a short period of time, many of the creatures in Missouri's caves spend their entire lives in caves.

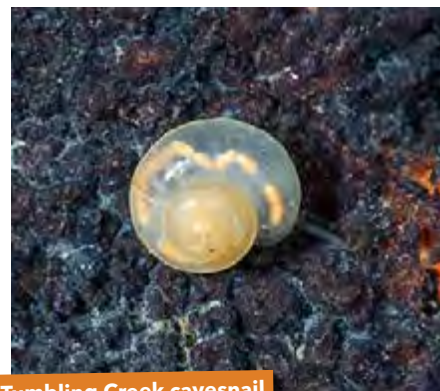
Some cave-dwelling species are only found in one cave in the entire world, while others are found throughout the Ozarks and the Midwest and beyond. Missouri has many endemic cave species, or those found nowhere else on earth, including the grotto sculpin, Tumbling Creek cavesnail, and many other invertebrates. Cave invertebrates are not well studied in Missouri and are considered species of conservation concern.

Where there's smoke there's fire, and people often think where there are caves there are bats. While bats play a vital role in cave ecology, not all caves are suitable for bats. Seven bat species depend on Missouri caves. The once common tricolored bat (*Perimyotis subflavus*) has declined in Missouri rapidly, due to white-nose syndrome. With 1-inch-long ears equipped for detecting moths, the federally endangered Ozark big-eared bat (*Corynorhinus townsendii ingens*) has not been officially documented in Missouri since the 1970s.

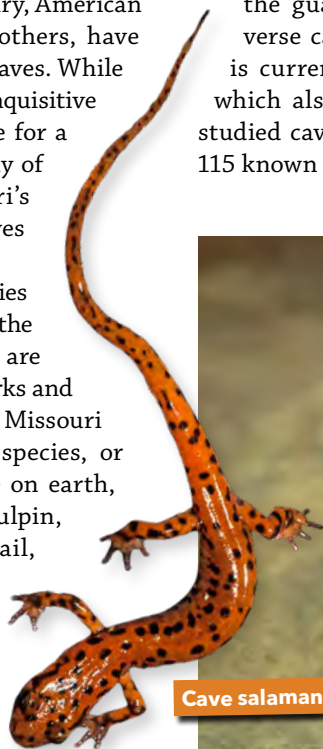
An estimated 800,000 gray bats (*Myotis grisescens*), a federally endangered bat, is holding strong throughout its range, including in the Show-Me State. A strong scent of ammonia wafting out of cave entrances in Missouri signals the presence of gray bats.

Gray bats play a vital role in Missouri's cave ecology. They are the only bat in Missouri that reside in caves year-round, so their guano piles

can be immense. Often gray bat caves are some of the most biodiverse. Grotto salamanders, cave-adapted springtails, rove beetles, cave-adapted millipedes, pseudoscorpions, and many other species of invertebrates benefit from the guano piles. The most biodiverse cave west of the Mississippi is currently Tumbling Creek Cave, which also happens to be the most studied cave in Missouri with at least 115 known species.



Tumbling Creek cavesnail



Cave salamander



Grotto sculpin



Gray bats





Teenagers exploring one of MDC's educational program caves.



### *Getting Involved and Protecting Caves*

With many Missouri cave species under threat, protecting caves and their cave life is more important than ever. While it isn't conducive to gate every cave, some caves benefit from a gate to protect designated natural areas, protect federally endangered species, and protect human safety. Protecting water quality not only helps surface plants and animals, but healthy water will ensure that subsurface creatures are also healthy. Caves should only be accessed through landowner permission. Always remember the caver's motto — "Take nothing but pictures, leave nothing but footprints, kill nothing but time."

Beginning in 2010, all caves on MDC land were closed to public access, to protect hibernating bats from the deadly white-nose syndrome (WNS). Since that time, select MDC-owned caves across the state were recently opened to limited, guided, public programs and tours.

With so much more to explore and document in Missouri caves, there are a variety of opportunities to get involved with mapping, monitoring, and inventorying these subterranean worlds. There are many caving organizations, referred to as grottos, all over Missouri. These organizations offer members opportunities to learn more about caves as well as exploring and monitoring. Statewide organizations include the Missouri Bat Census, Missouri Caves and Karst Conservancy, Missouri Speleological Survey, and the Cave Research Foundation.

Since MDC owns more than 300 caves, it is a daunting task to monitor all of them. Through a cooperative agreement, the Cave Research Foundation surveys, monitors, and maps MDC caves. This gives the public opportunities to see some of MDC-owned caves by conducting citizen science monitoring.

Please note that MDC-owned caves are still closed to public access except through the Cave Research Foundation and our educational programs. Please visit [mdc.mo.gov/events](https://mdc.mo.gov/events) and search "cave" for upcoming cave programs. To get involved with the Cave Research Foundation in Missouri, please visit [short.mdc.mo.gov/4fG](https://short.mdc.mo.gov/4fG). ▲

*Shelly Colatskie is a naturalist at MDC's Powder Valley Conservation Nature Center in Kirkwood, Missouri.*

### **White-Nose Syndrome and Amphibian Chytrid Fungus**

White-nose syndrome (WNS), an invasive fungal disease in bats, was discovered in New York in the winter of 2006-2007. The newly described fungus (*Pseudogymnoascus destructans*) made its way to the United States from Eurasia and spread quickly throughout the United States and Canada, killing millions of hibernating cave bats. While we do not know exactly how the fungus arrived in the United States, we know that protecting caves from extra disturbance while the bats are hibernating is giving the bats an extra fighting chance.

Cleaning gear and clothing between caves not only may prevent the spread of WNS, but it also helps prevent the spread of amphibian chytrid fungus.





# Swift-Water **Rescue**

MDC AGENTS LEARN LIFESAVING  
SKILLS FOR DANGEROUS WATERS

by Bill Graham | photographs by David Stonner





People were on top of vehicles, trapped in their cars, or stranded on shore when rescuers reached the surging floodwaters of the Little Third Fork River at sunrise on June 25, 2021. Storms had dropped 6 to 11 inches of rain on northwest Missouri overnight. A normally small and placid country stream was raging, and in pre-dawn darkness, the torrent swept unsuspecting motorists off Missouri 31 highway. Lt. Jason Braunecker, MDC protection district supervisor, was one of the first conservation agents on the scene in southwest DeKalb County, east of St. Joseph, along with sheriff's deputies and the Missouri Highway Patrol.

They didn't plunge in to help. Instead, they planned and prepared quickly but carefully, deciding what boat and equipment to use, and how to make approaches to victims with fast, heavy current boiling over a roadway. They observed obstacles

and evaluated what the water was doing. Carry a gallon of water in a bucket and you learn water's heavy weight. When thousands of gallons per second are rapidly flowing downhill, the force is immense, and people are helpless against that force unless they understand it.

That's where the swift-water rescue training MDC provides to conservation agents and public safety responders makes a difference between lives lost or saved. At the Little Third Fork River, frightened people were safely plucked off car tops, helped from inside their stranded vehicles, or assisted from floodwater to safe places. Some victims had medical issues and emergencies, too.

Fast-moving water, Braunecker said, "is powerful and relentless. We understand the power of water. We didn't beat Mother Nature. We used our training to make sure we safely saved people."



Good swimming skills are important, but so is the knowledge of how swift-water forces work.



## Learning in Fast Water

In May 2022, conservation agents were joined by personnel from fire departments in Riverside and Neosho to learn rescue skills in turbulent water being released from the Pomme de Terre Lake dam at Hermitage. By swimming, using inflatable boats, or setting up cross-stream rope rescue lines they tried out techniques for various swift-water scenarios in the swollen Pomme de Terre River. Completing the course gave participants rescue certification by Dive Rescue International.

“If they’re not swift-water certified,” said Braunecker, watching agents do swim rescue training, “it’s easy to get hurt or killed.”

Some agents in wetsuits and life jackets leaped into the river’s swirling currents to practice a swimming rescue. Agents near swift water always wear life jackets.

“Water exerts a force,” Braunecker said. “People underestimate the force of the water out there, it’s very intense. The force quadruples as water velocity doubles.”

Dangerous waters can occur anywhere in Missouri, whether from floods or in naturally fast Ozark streams. Since 2018,

MDC conservation agents have filed more than 230 incidents involving floods, weather, or fire. Some incidents did not result in a swift-water or flood rescue. But many did.

For example:

- On July 26, 2022, Conservation Agent Ben Pursley used a boat to help emergency crews rescue 116 people from flash flooding at an apartment complex in Hazelwood in St. Louis County.
- Conservation Agents Jade Wright, Anthony Maupin, and Eric Abbot were awarded a state Medal of Valor in 2014 for rescues they conducted in Holt County after a 9-inch rain caused flash flooding along Route N and Interstate 29.
- When Bryant Creek quickly rose 8 feet in Ozark County after a rain last July, Conservation Agents Justin Emery and Tom Leeker responded to a report of canoeists in danger. The canoeists managed to make it out on their own, but the agents were ready to help with an MDC inflatable boat.



## Good Gear and Water Skills

Inflatable boats, similar to inflatable rafts, provide better maneuverability and stability in swift water than johnboats, said Capt. Gerald Smith, who supervises agents in MDC's Ozark region. Hand-tillered outboard motors are mounted on the transom. They are shorter than patrol boats and ride high on the water, giving current less surface to push against.

"Aluminum boats have limitations," Smith said. "Inflatable boats can withstand the dynamic water flow conditions experienced during flooding."

MDC personnel have always done swift-water rescues when needed. They used their boating and swimming experience and whatever equipment was available. But in 2012, Cpl. Aaron Post of Platte County and Smith took the rescue certification training at Dive Rescue International in Colorado. More training followed, and they and other agents have been certified as instructors. For 10 years Post and Smith have led MDC's swift-water rescue training programs. MDC acquired more equipment for rescues. Now, about 60 agents have been certified as rescuers along with personnel from other emergency response agencies. Thirteen conservation agents were in last May's class.

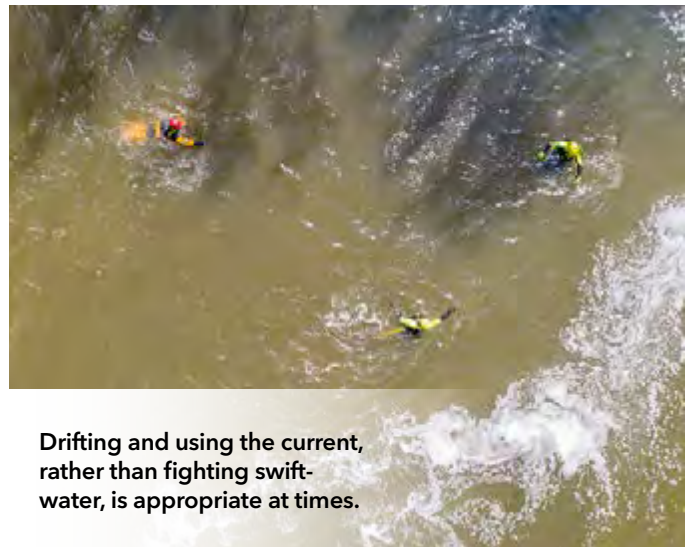
"You need to be a really good swimmer and comfortable in the water," Smith said.

They are skills agents are likely to use. For instance, Ozark rivers like the Current, Eleven Point, and Jacks Fork can rise quickly after heavy rains and strand floaters and campers. High water can sweep boats and people into trees and brush outside the channel, pinning them. "Strainers," rescuers call such obstacles. Smith helped rescue people in trouble along Ozark rivers during severe flooding in 2017.

"During flash floods the water flowing in rivers is much more dynamic and powerful," Smith said. "It can be violent. We know it's predictable, but it's also relentless. This training teaches our agents what their limitations are in rescues, what they can and can't do."



Intricate rope skills provide safety first in complex rescues.



Drifting and using the current, rather than fighting swift-water, is appropriate at times.



Inflatable boats are preferred for rescues because they maneuver easier in swift water.



## Real Deal Challenges

Agents in swift-water rescue training have the opportunity for rest periods. But they know carrying out a real rescue might be different.

"This is challenging," said Agent Christine Hibler of St. Charles County. "Remaining calm when it's real water, making sure there's no mistakes, you're going to be operating under stress and you're going to be operating under a time crunch when there's no room for mistakes. I've got the Missouri and the Mississippi rivers, a great deal of water. We encounter floods. But with this training, we'll know what we're doing and what's required."

Agents learn self-rescue if they are caught in swift water and survival swimming techniques, such as keeping your head up to look for obstacles and keeping your feet up away from underwater tangles, trees, rocks, or buildings. They practice dead lifting a helpless or exhausted victim into a boat. Much of the rescue training involves how to effectively maneuver a boat in the types of currents, whirlpools, and eddies they will encounter.

Getting a boat to someone in need of rescue is just one aspect. Agents operating the motor need to know how to hold the boat steady in swift current so others on the team can pass life jackets to victims, give them instructions, and help them

into the boat. Then the loaded boat must maneuver back to safety through floodwater.

Calm thinking is required, Smith said. When someone needs help, instinct says to act immediately. But agents are taught to be a voice of calm for people in peril, or for rescuers waiting on other team members and equipment to arrive.

"I did a rescue on the upper Current River where a woman was caught in a strainer," he said. "We finally talked her through it. She had panicked and didn't know what to do."

Teamwork is important in rescues. That includes coordinating with other responding agencies. Teams in the training last May had to launch boats, maneuver in current, and have a front team member touch a sign on shore. The sign touch is not that easy in very swift water. Controlling a boat while operating an outboard motor tiller in swift water is very different than in calm water. Agents will deploy backup boats during an emergency rescue when possible, in case rescuers get in trouble.

"Being a strong swimmer and a competent boat handler are required skills," Post said. "But being able to make good decisions is critical. You have to make good decisions using risk-benefit analysis. Is the water changing? Is the water falling or is the water rising? Sometimes you've got to make a really hard decision. Sometimes in minutes or hours, sometimes in split seconds."

Agents learn how to safely lift an injured or deceased swimmer into a boat.







**Teamwork is key in carrying out cross-channel rescues.**

Special gear improves efficiency and safety, like this gun that shoots a rope across a stream to start setting up a rescue line system.



## Reducing Risk

Rescuers refer to SANE tactics: Simple approach; Adequate backup; Never take chances, Eliminate a beat-the-water attitude.

“You can be the best swimmer in the world and swift water will get you every time,” Post said.

But rescuers can use the predictable qualities of water to their advantage. Water always flows in one direction. Flow is constant. When flow hits obstacles it takes the same path around. Knowing this helps rescuers evaluate conditions and make decisions.

Agent Kearby Bridges of Stone County grew up near the Eleven Point River and had boating experience prior to joining MDC. But operating inflatables or other boats in rescue situations, with obstacles and floating flood debris, is far different than recreational boating. Especially when someone’s life is on the line.

“The river is a force of nature,” Bridges said. “It’s not your enemy. But it’s not your friend, either. You have to respect it.”

Training leaders at Pomme de Terre watched trainees in an inflatable boat cross the fast water to the east shore. A team on the west side shot a rope line across with a special gun. Then teams on both sides used ropes, poles, and pulleys anchored to trees to set up a secure rope that a rescue boat could attach to and practice moving victims or equipment from one shore to another on dangerous water.

“We want to minimize risk,” Braunecker said, “but there’s still risk involved.” ▲

*MDC Media Specialist Bill Graham serves the Kansas City and Northwest regions. He’s a lifelong hunter, angler, and camper. He also enjoys hiking and photographing Missouri’s best wild places.*



# Resuming Her Loveliness

AWAKENING FROM WINTER, NATURE  
ABOUNDS WITH BEAUTY

---

The beautiful spring came, and when nature resumes her loveliness, the human soul is apt to revive also.

— Harriet Ann Jacobs

**M**arch 20 marks the spring — or vernal — equinox in North America. It is the first official day of spring, which signals longer days ahead.

But it is so much more than that.

Missouri outdoors is waking up from its long winter slumber and alive with activity. Trees are budding. Wildflowers are in bloom and the hub of commotion from visiting bees and butterflies. Birds are merrily chirping as they nest and feed their young. Frogs are calling from nearby ponds. Water that once stood still in blocks of ice now flow freely, teeming with fish ready to catch.

The next few pages will showcase the beauty that awaits us this spring in the Show-Me State. It's a time of change, a time of renewal and rebirth. The sights and sounds are as wonderful as the aromatic fragrances from the blooming flowers and trees. Get out and discover it!



Eastern cottontail rabbits by Noppadol Paothong  
150mm lens • f/5.6 • 1/1000 sec









**Pied-billed grebe** by Noppadol Paothong

600mm lens • f/8 • 1/500 sec

**Eastern tiger swallowtail** by Noppadol Paothong

400mm lens • f/5.6 • 1/500 sec

**Bluebells** by Noppadol Paothong

15mm lens • f/22 • 160 sec

**Right: Wild turkey** by Noppadol Paothong

800mm lens • f/7.1 • 1/500 sec







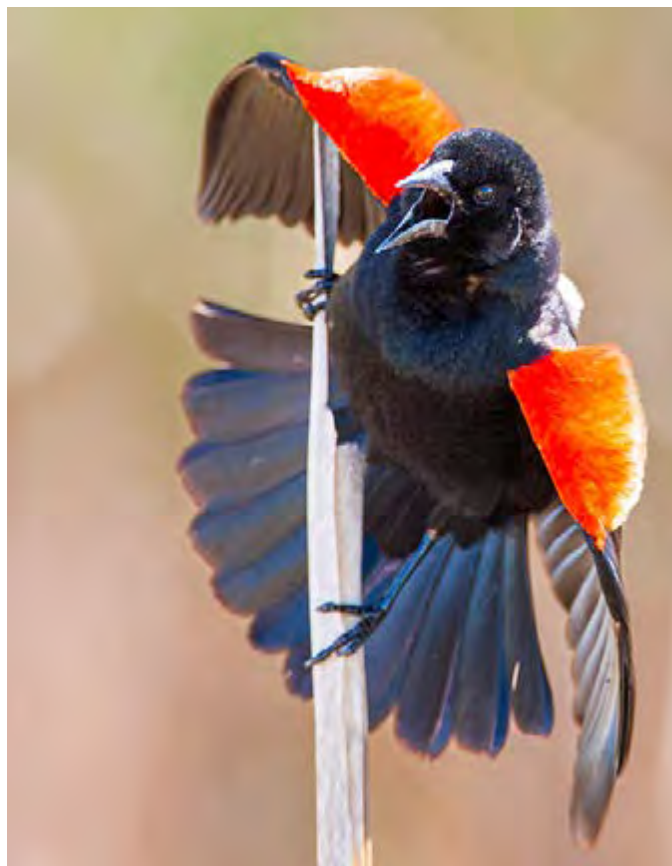




Lead Mine CA by David Stonner 70mm lens • f/5.6 • 1/125 sec

Blooming redbuds and dogwoods at Lead Mine CA by David Stonner 70mm lens • f/5.6 • 1/250 sec





**Eastern spiny softshell turtle** by David Stonner

200mm lens • f/5 • 1/800 sec

**Red fox** by Noppadol Paothong

600mm lens • f/8 • 1/100 sec

**Red-winged blackbird** by Noppadol Paothong

500mm lens • f/7.1 • 1/100 sec

**Columbine** by Noppadol Paothong

15mm lens • f/11 • 1/125 sec



# Get Outside

in MARCH →

Ways to connect with nature



White clover

## The Forecast Calls for Snow Geese

Snow geese and other waterfowl are moving through Missouri, especially at national wildlife refuges and other large wetland sanctuaries. Listen for large V- and W-shaped flocks of snow geese overhead, including at nighttime. If you are hearing a chorus of squawking yips in the distance, you may think it's coyotes, but look up. It could be snow geese. Their white wings reflect city lights below and look silvery against the night sky.



Snow geese



Sowbug

## Head to the Water

As the water temperature increases, so does the activity of many aquatic invertebrates. Visit a fast-flowing Ozark stream on a sunny day and keep an eye out for caddisfly larvae, aquatic snails, aquatic sowbugs, crayfish, and much more. The online *Field Guide* ([short.mdc.mo.gov/Z9d](http://short.mdc.mo.gov/Z9d)) can help you identify what you find.

## Wonders of Wildflowers

Are you interested in learning more about Missouri's native wildflowers. March is an excellent time to start. This month, the outdoors is alive with blooming flowers. As you go out and explore, use MDC's online *Field Guide* ([short.mdc.mo.gov/4fb](http://short.mdc.mo.gov/4fb)) as your reference.



Blue-eyed grass



Dutchman breeches



Bloodroot

### Natural Events to See This Month

Here's what's going on in the natural world.



Oyster mushrooms, choice edibles, appear.



Eastern gartersnakes mate.



Red foxes birth a single litter.



## Show-Me Luck

Are there shamrocks in Missouri? Clovers and wood-sorrels both have trifoliate leaves, similar to the distinct three-leaf shamrock. White clover and yellow wood sorrel even have beautiful blooms. Learn more at [short.mdc.mo.gov/4fu](https://short.mdc.mo.gov/4fu) and [short.mdc.mo.gov/4fl](https://short.mdc.mo.gov/4fl).

VIRTUAL

### Outdoor Cooking: Cast Iron and Dutch Oven: 1 Basics and Selection

Tuesday • March 7 • noon-1 p.m.

Location: MDC Virtual Nature Center

Registration required by March 7 at [short.mdc.mo.gov/4fE](https://short.mdc.mo.gov/4fE) or by calling 888-283-0364.

All ages.

Cast iron cooking is a fun and tasty way to add to any outdoor adventure. This series of virtual programs is designed to boost your knowledge so you can cook a wide variety of great recipes around camp while making it fun and easy! In part one of this six-part series, we will discuss the basics of cast iron cooking and how to select the right tools to meet every need around the campfire.

VIRTUAL

### Outdoor Cooking: Cast Iron and Dutch Oven: 2 Clean, Care, and Season

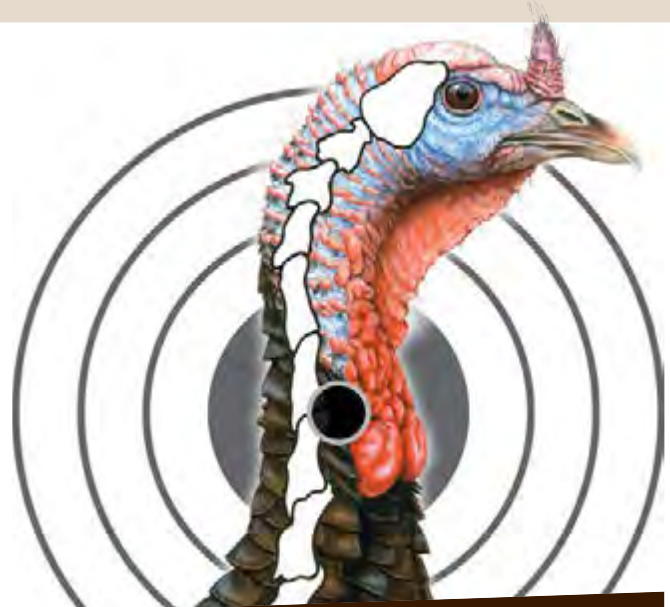
Tuesday • March 14 • noon-1 p.m.

Location: MDC Virtual Nature Center

Registration required by March 14 at [short.mdc.mo.gov/4fa](https://short.mdc.mo.gov/4fa) or by calling 888-283-0364.

All ages.

Cast iron cooking is a fun and tasty way to add to any outdoor adventure. This series of virtual programs is designed to boost your knowledge so you can cook a wide variety of great recipes around camp while making it fun and easy! Part two of this virtual series will provide information on setting up your cast iron by seasoning it, cleaning, and caring for it so you can use it for years to come.



## SIGHT IN FOR TURKEY SEASON

Don't wait! Now is the time to head to one of MDC's five **shooting range and outdoor education centers** to sharpen your skills and pattern your shotgun.

- 1 **Andy Dalton — Ash Grove**  
[mdc.mo.gov/andydalton](https://mdc.mo.gov/andydalton)
- 2 **Lake City — Buckner**  
[mdc.mo.gov/lakecity](https://mdc.mo.gov/lakecity)
- 3 **Jay Henges — High Ridge**  
[mdc.mo.gov/hengesrange](https://mdc.mo.gov/hengesrange)
- 4 **Parma Woods — Parkville**  
[mdc.mo.gov/parmawoods](https://mdc.mo.gov/parmawoods)
- 5 **August A. Busch — Weldon Spring**  
[mdc.mo.gov/buschrage](https://mdc.mo.gov/buschrage)



### Not a turkey hunter, but want to learn?

Our staff of specialists can help you master firearms and archery, wildlife identification, and many other outdoor skills. Visit [mdc.mo.gov/shootingranges](https://mdc.mo.gov/shootingranges) to learn more.



Serving nature and you®



# Places to Go

## OZARK REGION

### Shannon Ranch Conservation Area

A healthy outing

by Larry Archer

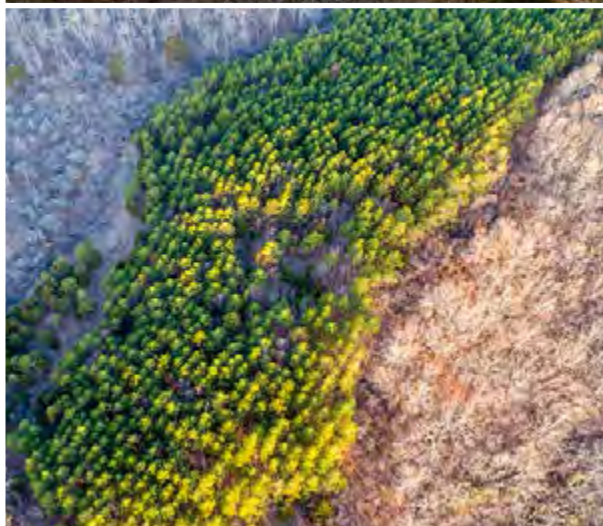
✳ **The connection between** exposure to nature and improved health is becoming increasingly clear, but Shannon Ranch Conservation Area (CA) has had a close connection to healthcare since becoming a conservation area in 1984.

Shannon Ranch CA's original 985 acres in Douglas County were purchased in 1984 at a reduced price from a group of Springfield doctors, who had purchased it from the family for whom it was named. With two other additions in the 1980s and 1990s, the area now weighs in at a healthy 1,565 acres.

With nearly 10 miles of service roads open year-round to hiking and biking, Shannon Ranch CA gives visitors access to a variety of habitat types, said Private Land Forester Shane Rice.

"It's probably 53 percent or so good timber sites that we're managing for forest products and wildlife, and roughly 39 percent of the area is glade and woodland type habitat," Rice said. "We're actively managing the glades and woodlands with saw work and fire."

Many of the trails pass by the area's 11 fishless ponds, which attract wildlife and increase the odds of trail users getting a glimpse of some of the area's native residents.



"It's your typical Ozarks — there's lots of hills and valleys and scenic vistas."

—Private Land Forester  
Shane Rice

DAVID STONNER





Sunrise rakes over hilltop glades at Shannon Ranch CA. The access road leads through glades, woodlands, and pine stands to multiple small creeks. (Inset) A block of pine stands in stark contrast to the hardwood forests in the rugged hills at Shannon Ranch CA.



## SHANNON RANCH CONSERVATION AREA

consists of 1,565 acres in Douglas County. From Vanzant, take Highway 95 south 1.25 miles.

36.9443, -92.3177

[short.mdc.mo.gov/4fi](http://short.mdc.mo.gov/4fi) 417-746-0291

### WHAT TO DO WHEN YOU VISIT



**Biking** Includes 10.7 miles of improved and service roads open year-round to biking.



**Birdwatching** The eBird list of birds recorded at Shannon Ranch CA is available at [short.mdc.mo.gov/4f5](http://short.mdc.mo.gov/4f5).



**Camping** Designated camping sites.

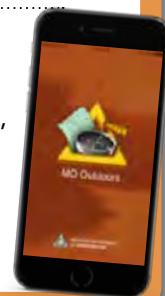


**Hunting** Deer and turkey. Regulations are subject to annual changes. Refer to MDC's regulation page online at [short.mdc.mo.gov/Zjw](http://short.mdc.mo.gov/Zjw).

Also **bear, dove, quail, rabbit, and squirrel**

### DISCOVER MO OUTDOORS

Users can quickly and easily find outdoor activities close to home, work, or even while traveling with our free mobile app, MO Outdoors. Available in Android or iPhone platforms at [mdc.mo.gov/mooutdoors](http://mdc.mo.gov/mooutdoors).



### WHAT TO LOOK FOR WHEN YOU VISIT



White-tailed deer



Wild turkey



Eastern collared lizard



Red-tailed hawk





## Spring Peeper

*Pseudacris crucifer*

**Status**  
Common

**Size**  
¾ to 1¼ inches,  
occasionally to 1½ inches

**Distribution**  
Nearly statewide



**Did You Know?**  
Spring peepers overwinter in the soil. A natural antifreeze in their blood keeps them from freezing.

The spring peeper is a small, slender frog with an X-shaped mark on its back. The general color can be pink, tan, light brown, or gray. This woodland species lives near ponds, streams, or swamps where there is thick undergrowth. Spring peeper abundance is positively associated with increased forest cover. The spring peeper usually remains hidden during the day, becoming active at dusk.



### LIFE CYCLE

Spring peepers breed in late February to mid-May in small woodland pools. Breeding adults migrate to ponds in early March to late April where males call from the water's edge or from dead leaves or branches sticking out of the water. Females lay around 900 eggs singly, attached to dead leaves, grasses, or sticks in shallow water. A male peeper fertilizes the eggs as they are laid. Depending on water temperature, eggs hatch in 3-14 days and tadpoles metamorphose about three months later.



### FOODS

Spring peepers forage on leaf litter and other surface debris for a variety of small insects and spiders. They help control populations of the insects on which they feed.



### HUMAN CONNECTIONS

Spring peepers are one of the first species to begin calling each year. The peeping call is repeated about once per second. A chorus of spring peepers can sound like hundreds of small jingle bells. Their peeping, jingling choruses are greeted as a true harbinger for spring, and a sign that the back of winter is broken.



# Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖



## FISHING

### Black Bass

Impounded waters and non-Ozark streams:  
Open all year

Most streams south of the Missouri River:

- ▶ Catch-and-Release:  
March 1–May 26, 2023

### Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2023

### Nongame Fish Giggling

Impounded Waters, sunrise to sunset:  
Feb. 16–Sept. 14, 2023

### Paddlefish

Statewide:  
March 15–April 30, 2023

On the Mississippi River:

March 15–May 15, 2023  
Sept. 15–Dec. 15, 2023

### Trout Parks

State trout parks are open seven days a week  
March 1 through Oct. 31.

Catch-and-Keep:

March 1–Oct. 31, 2023

## TRAPPING

### Beaver, Nutria

Nov. 15, 2022–March 31, 2023

### New! Special Trapping Season for Private Lands Only:

Coyote, Opossum, Raccoon,  
Striped Skunk

March 1–April 14, 2023

## HUNTING

### Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2023

### Coyote

Restrictions apply during April, spring turkey  
season, and firearms deer season.

Open all year

### Crow

Nov. 1, 2022–March 3, 2023

Nov. 1, 2023–March 3, 2024

### Deer

Archery:

Sept. 15–Nov. 10, 2023

Nov. 22, 2023–Jan. 15, 2024

Firearms:

- ▶ **New!** Early Antlerless Portion  
(open areas only): Oct. 6–8, 2023
- ▶ Early Youth Portion (ages 6–15):  
Oct. 28–29, 2023
- ▶ November Portion:  
Nov. 11–21, 2023
- ▶ **New!** CWD Portion (open areas only):  
Nov. 22–26, 2023
- ▶ Late Youth Portion (ages 6–15):  
Nov. 24–26, 2023
- ▶ Late Antlerless Portion (open areas only):  
Dec. 2–10, 2023
- ▶ Alternative Methods Portion:  
Dec. 23, 2023–Jan. 2, 2024

### Groundhog (Woodchuck)

May 8–Dec. 15, 2023

### Pheasant

Youth (ages 6–15):

Oct. 28–29, 2023

Regular:

Nov. 1, 2023–Jan. 15, 2024

### Quail

Youth (ages 6–15):

Oct. 28–29, 2023

Regular:

Nov. 1, 2023–Jan. 15, 2024

### Rabbit

Oct. 1, 2023–Feb. 15, 2024

### Squirrel

May 27, 2023–Feb. 15, 2024

### Turkey

Archery:

Sept. 15–Nov. 10, 2023

Nov. 22, 2023–Jan. 15, 2024

Firearms:

- ▶ Youth (ages 6–15): April 1–2, 2023
- ▶ Spring: April 17–May 7, 2023
- ▶ Fall: Oct. 1–31, 2023

### Waterfowl

See the Migratory Bird and Waterfowl

Hunting Digest or visit [short.mdc.mo.gov/ZZx](http://short.mdc.mo.gov/ZZx) for  
more information.



## Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to buy permits,  
electronically notch them, and Telecheck  
your harvest. MO Fishing lets you buy  
permits, find great places to fish, and ID  
your catch. Get both in Android or iPhone  
platforms at [short.mdc.mo.gov/Zi2](http://short.mdc.mo.gov/Zi2).

For complete information about seasons, limits,  
methods, and restrictions, consult the *Wildlife  
Code of Missouri* at [short.mdc.mo.gov/Zib](http://short.mdc.mo.gov/Zib).  
Current hunting, trapping, and fishing regulation  
booklets are available from local permit vendors  
or online at [short.mdc.mo.gov/ZZf](http://short.mdc.mo.gov/ZZf).





*Serving nature and you<sup>®</sup>*



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The calendar says spring begins March 20, but signs of the season — like these blooming bluebells — aren't waiting. A stunning, early blooming wildflower, bluebells are amongst the harbingers of spring. Get outside! What other early signs of spring will you discover?

📷 by **Noppadol Paothong**

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